REMARKS

Applicants have amended claims 3-8, 17, 19 and 21-23 and canceled claims 1 and 2. Claims 3-25 are pending. Reconsideration of the application, as amended, is requested.

Applicants bring to the Examiner's attention that claim 5 has been rewritten in independent form, including the recitations of now-canceled claims 1 and 2. Claims 3-4 and 6-25 depend from claim 5, either directly or indirectly.

REJECTION UNDER 35 USC 102(b) OVER BILLMERS

Claims 1-3, 8-10, 14, 17 and 18 were rejected an anticipated by Billmers et al. (U.S. 4,839,449). Applicants disagree.

Billmers relates to polysaccharides prepared from amine compounds containing only one primary amine. Billmers does not disclose, at least, that the starch component has a reactive carbonyl functionality of at least 5 microequivalents per gram, as recited in amended claim 5, from which each of pending claims 3, 8-10, 14, 17 and 18 depend. Accordingly, Applicants' claims are not anticipated by Billmers and withdrawal of the rejection is requested.

REJECTION UNDER 35 USC 102(b) OVER ESPY

Claims 1-4, 8 and 21-24 were rejected an anticipated by Espy (U.S. 3,728,214). Applicants disagree.

Espy discloses polyamine-acrylamide-polyaldehyde resins, useful as wet end additives in the production of paper. Espy reacts a polyamine with an acrylamide, and then reacts the resulting adduct with an aldehyde. Espy does not disclose, at least, that the starch component has a reactive carbonyl functionality of at least 5 microequivalents per gram, as recited in amended claim 5, from which each of pending claims 3-4, 8 and 21-24 depend. Accordingly, Applicants' claims are not anticipated by Espy and withdrawal of the rejection is requested.

REJECTION UNDER 35 USC 102(e) OVER CIMECIOGLU

Claims 1-4, 8-10, 17, 18 and 21-24 were rejected an anticipated by Cimecioglu (U.S. 6,368,456). Applicants disagree.

Cimecioglu discloses use of, as a paper additive, an aldehyde functional polymer, an aldehyde reactive polymer, or a combination thereof. Cimecioglu does not disclose using, as a paper additive, a product of the two components that has been pre-reacted, prior to addition to the paper. Amended claim 5, and pending claims 3-4, 8-10, 17, 18 and 21-24 which depend therefrom, require that the claimed product be a pre-reacted product. Accordingly, Applicants' claims are not anticipated by Cimecioglu and withdrawal of the rejection is requested.

REJECTION UNDER 35 USC 102(e) OVER NEISSNER ET AL.

Claims 1-4, 8, 19 and 20 were rejected an anticipated by Neissner et al. (U.S. 6,235,835) Applicants disagree.

Neissner discloses an anionically modified starch reacted with a cationic polymer. The product is useful in preparing paper. However, this patent does not disclose that the starch component has a reactive carbonyl functionality of at least 5 microequivalents per gram, as recited in amended claim 5, from which each of pending claims 3-4, 8, 19 and 20 depend. Accordingly, at least for this reason Applicants' claims are not anticipated by Neissner and withdrawal of the rejection is requested.

REJECTION UNDER 35 USC 102(b) OVER TAYLOR

Claims 1-3, 8, 19 and 20 were rejected an anticipated by Taylor (U.S. 3,719,514). Applicants disagree.

Taylor discloses a starch binder composition prepared by reacting an anionic starch containing carboxylic groups with a polyalkylenimine. However, the patent does not disclose that the starch has a reactive carbonyl functionality of at least 5 microequivalents per gram, as recited in amended claim 5, from which each of pending claims 3, 8, 19 and 20 depend. Accordingly, Applicants' claims are not anticipated by Taylor and withdrawal of the rejection is requested.

REJECTION UNDER 35 USC 103 OVER DISHBURGER

Claims 1-3, 19 and 20 were rejected as unpatentable over Dishburger et al. (U.S. 3,467,608). Applicants disagree.

Dishburger does not disclose nor suggest, nor would there have been motivation from the disclosure of Dishburger, to utilize a starch component that has a reactive carbonyl functionality of at least 5 microequivalents per gram, as recited in amended claim 5, from which each of pending claims 3, 19 and 20 depend. Accordingly, Applicants' claims are not obvious in view of Dishburger and withdrawal of the rejection is requested.

REJECTION UNDER 35 USC 103 OVER CIMECIOGLU ET AL. IN VIEW OF BILLMERS

Claims 5 and 7 were rejected as unpatentable over Cimecioglu et al. (U.S. 6,368,456) in view of Billmers et al. (U.S. 4,839,449). Applicants disagree.

Cimecioglu, as discussed, above, discloses the use of an aldehyde functional polymer, an aldehyde reactive polymer, or a combination thereof. Additionally, Cimecioglu states that the aldehyde derivates may have up to 15 mole % of C-6 aldehyde groups per mole of starch anhydroglucose units. However, there is no disclosure or suggestion in Cimecioglu that the paper additive may be a product prepared by pre-reacting a starch aldehyde derivative and a polymer containing functional groups capable of reacting with aldehyde groups. At most, as stated at column 4, lines 40-43, of Cimecioglu, the aldehyde functional polymer additive may be used either alone or in conjunction with a polymer additive containing functionality capable of reacting with aldehyde groups. This is also apparent from Claim 1 of the Cimecioglu patent, which requires the paper making process to incorporate at least one additive polymer selected form an aldehyde functional polymer and a polymer containing functional groups capable of reacting with aldehyde groups. Accordingly, there is no requirement that a polymer of each type mentioned be present, let alone that there be a pre-reacted product resulting from a polymer of each type being reacted.

Although Billmers discloses a formula for determining microequivalents per gram of starch, Billmers does not remedy the deficiencies of Cimecioglu, such as teaching or suggestion a pre-reacted product of the specified polymers.

Accordingly, the products of Applicants' Claims 5 and 7 are patentable, at least because the products are pre-reacted. Applicants' claims are not obvious in view of Cimecioglu in view of Billmers, and withdrawal of the rejection is requested.

Applicants note that Claim 6 has been indicated to be allowable; Claim 6 includes that the starch component has a reactive carbonyl functionality of at least 10 microequivalents per gram. In addition, the product of Claim 6 includes a pre-reacted product.

REJECTION UNDER 35 USC 103(a) OVER CIMECIOGLU

Claims 14-16 were rejected as unpatentable over Cimecioglu et al. (U.S. 6,368,456). Applicants disagree.

Cimecioglu discloses use of, as an additive in producing paper, a starch aldehyde derivative prepared by oxidation with an oxidant having an oxidizing power of up to 14.18 g of active chlorine per mole of starch unit. However, Cimecioglu does not disclose or suggest an additive formed by pre-reacting an oxidized starch aldehyde derivative and a polymer additive containing functionality capable of reacting with aldehyde groups, that is added to paper production. Applicants' pending claims require that the starch component of the pre-reacted product have a reactive carbonyl functionality of at least 5 microequivalents per gram, as recited in amended claim 5, from which claims 14-16 depend. There is no suggestion in Cimecioglu of such a pre-reacted product, nor would the disclosure of Cimecioglu lead one to such a product. Accordingly, Applicants' claims are not obvious in view of Cimecioglu, and withdrawal of the rejection is requested.

REJECTION UNDER 35 USC 102/103 OVER ESPY

Claim 25 was rejected an anticipated by, or in the alternative unpatentable over, Espy (U.S. 3,728,214). Applicants disagree.

Espy discloses polyamine-acrylamide-polyaldehyde resins useful in wet end production of paper. The additive of Espy, however, is not the additive of Applicants' claimed invention. Espy reacts a polyamine with an acrylamide, and reacts the resulting adduct with an aldehyde containing compound. Applicants' products are prepared by reacting an amine with an aldehyde. There is no disclosure or suggestion in Espy of reacting an amine with an aldehyde, therefore Claim 25 is not anticipated by nor obvious over Espy. Withdrawal of the rejection is requested.

REJECTION UNDER 35 USC 102/103 OVER CIMECIOGLU

Claim 25 was rejected an anticipated by, or in the alternative unpatentable over, Cimecioglu et al. (U.S. 6,368,456). Applicants disagree.

Cimecioglu discloses preparing paper containing 0.05-15% of an additive. The Examiner has correctly noted that the additive of the Cimecioglu patent is either singly or in combination, an aldehyde functional polymer and/or an aldehyde reactive polymer. Applicants' pending claims require that the additive be pre-reacted prior to introduction into the papermaking process. There is no disclosure or suggestion in Cimecioglu of pre-reacting the additive prior to introduction to the process, therefore Claim 25 is not anticipated by nor obvious over Cimecioglu. Withdrawal of the rejection is requested.

ALLOWABLE SUBJECT MATTER

Claims 6 and 11-13 were indicated as being allowable, when written in proper form. Claims 6 and 11-13 depend from now-amended claim 5, which Applicants believe is patentable.

SUMMARY

Applicants submit that the claims are in proper form for allowance and respectfully request reconsideration and allowance thereof. A Notice of Allowance is requested.

Attached is a marked-up version of the amendments made to the claims by the current amendment. The attached page is captioned "**VERSION WITH MARKINGS TO SHOW CHANGES MADE**".

The Examiner is invited to contact the undersigned representative if it will facilitate prosecution of this application.

Respectfully Submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

Claims 3-8, 17, 19 and 21-23 have been amended as follows:

3. (Amended) A composition according to claim [1] 5 wherein:

(a) the polymer component includes reactive groups selected from primary amine groups, secondary amine groups, and mixtures thereof.

4. (Amended) A composition according to claim [1] 5 wherein:

(a) the polymer component comprises polyvinylamine.

5. (Amended) A composition [according to claim 1 wherein:

(a)] comprising an adducted combination formed by reacting

(a) a starch component having polymer reactive carbonyl functionality; and

(b) a polymer component having carbonyl reactive functionality, wherein the starch component has a reactive carbonyl functionality of at least 5 microequivalents per gram.

6. (Amended) A composition according to claim [1] 5 wherein:

(a) the starch component has a reactive carbonyl functionality of at least 10 microequivalents per gram.

7. (Amended) A composition according to claim [1] 5 wherein:

(a) the starch component has a reactive carbonyl functionality of no more than 300 microequivalents per gram.

8. (Amended) A composition according to claim [1] 5 wherein:

(a) the starch component comprises an oxidized starch.

17. (Amended) A composition according to claim [1] 5 wherein:

(a) the starch component has a ratio of reactive carbonyl functionality to carboxyl functionality of at least 1:1.

19. (Amended) A composition according to claim [1] 5 wherein:

(a) the polymer component is provided in an amount of 0.1%-5.0% by wt., based on wt. of starch component.

21. (Amended) A paper product including:

(a) at least 2%, by wt., of a composition according to claim [1] 5.

22. (Amended) A method of making paper comprising:

(a) providing in a wet end process, a composition in accord with claim [1] 5 at a level of at least 2%, based on dry wt. of paper.

23. (Amended) A method according to claim 22 comprising:

(a) providing in the wet end process, a composition in accord with claim [1] 5 at a level of at least 4%, based on dry wt. of paper.